

**Wolf
Management Report
of survey-inventory activities
Federal Aid in Wildlife Restoration
1 July 1996–30 June 1999**

**Mary U. Hicks, Editor
Alaska Department of Fish and Game
Division of Wildlife Conservation
December 2000**

Please note that population and harvest data in this report are estimates and may be refined at a later date.

If this report is used in its entirety, please reference as: Alaska Department of Fish and Game. 2000. Wolf management report of survey-inventory activities. Federal Aid in Wildlife Restoration 1 July 1996–30 June 1999. M. Hicks, editor. Juneau, Alaska.

If used in part, the reference should include the unit number, page numbers and author's name, which can be found at the end of each unit.

Funded through Federal Aid in Wildlife Restoration, grants W-27-1 and W-27-2.

STATE OF ALASKA

Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME

Frank Rue, Commissioner

DIVISION OF WILDLIFE CONSERVATION

Wayne L. Regelin, Director

Persons intending to cite this material should receive permission from the author(s) and/or the Alaska Department of Fish and Game. Because most reports deal with preliminary results of continuing studies, conclusions are tentative and should be identified as such. Please give authors credit.

Free copies of this report and other Division of Wildlife Conservation publications are available to the public. Please direct requests to our publications specialist:

**Mary Hicks
Publications Specialist
ADF&G, Wildlife Conservation
P.O. Box 25526
Juneau, AK 99802
(907) 465-4190**

The Alaska Department of Fish and Game administers all programs and activities free from discrimination based on race, color, national origin, age, sex, religion, marital status, pregnancy, parenthood, or disability. The department administers all programs and activities in compliance with Title VI of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title II of the Americans with Disabilities Act of 1990, the Age Discrimination Act of 1975, and Title IX of the Education Amendments of 1972.

If you believe you have been discriminated against in any program, activity, or facility, or if you desire further information please write to ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; U.S. Fish and Wildlife Service, 4040 N. Fairfield Drive, Suite 300, Arlington, VA 22203 or O.E.O., U.S. Department of the Interior, Washington DC 20240.

For information on alternative formats for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-4120, (TDD) 907-465-3646, or (FAX) 907-465-2440.

LOCATION

GAME MANAGEMENT UNIT: Unit 23 (43,000 mi²)

GEOGRAPHIC DESCRIPTION: Western Brooks Range and Kotzebue Sound

BACKGROUND

Wolves are indigenous to northwest Alaska. Prior to statehood in 1959, wolves were subject to bounty hunts and predator control programs to protect reindeer and caribou (McKnight 1973). After statehood, liberal hunting and trapping regulations, which allowed aerial shooting and same-day-airborne hunting (SDA), replaced these practices. High fur prices in the mid 1970s attracted nonlocal hunters to Unit 23 and stimulated local hunter and trapper efforts. As a result, wolf harvests were high when snow conditions were favorable for aircraft and snowmachines. During the 1980s, regulatory restrictions on aircraft and low fur prices reduced the harvest of wolves. Today, use of aircraft for hunting is prohibited throughout Unit 23. Local residents using snowmachines harvest most wolves in Unit 23.

In the middle Kobuk River, during May 1990, Ballard (1993) estimated a density of 1 wolf/50 mi² (80% CI 37–74 mi²) using a line-intercept track-sampling technique. Extrapolating this density to all of Unit 23 yields a population estimate of 869 wolves (80% CI, 580–1169). Local biologists and residents recognize 4 geographic areas where wolf densities need to be separately assessed: 1) Northern Seward Peninsula west of and including the Buckland drainage; 2) upper Kobuk River drainage; 3) Noatak, Wulik and Kivilina river drainages to Cape Lisburne, and 4) lower Kobuk and Selawik river drainages. This unit-wide estimate should be viewed as a crude approximation of actual abundance. Given the abundance of caribou and presence of moose and sheep in Unit 23 and the remoteness of much of the unit, we expect wolf numbers to be regulated largely by natural factors.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Management goals are to maintain viable populations of wolves in Unit 23, provide hunting and viewing opportunities, and minimize adverse interactions between wolves and people.

MANAGEMENT OBJECTIVES

Management objectives are to maintain the furbearer-sealing program and explore alternate harvest reporting systems.

METHODS

We estimated harvests from fur sealing certificates. We also collected incidental observations of wolves from staff and local residents. In 1998–1999 a modified version of the statewide trapper questionnaire was mailed to a sample of unit residents. Trappers who sealed a furbearer within the last 3 years or individuals knowledgeable about wolves were asked about

abundance and population trends. Also, in 1998–1999, individual households were surveyed in Shungnak as part of a community based harvest assessment project. The department (Division of Wildlife Conservation and Subsistence Division) and Maniilaq Association conducted the project (Georgette 1999).

No quantitative population data were collected during this reporting period.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Based on the responses of trappers and staff observations, there has been no significant change in wolf abundance during this reporting period. Late and low snowfall accompanied by high winds led to poor travel and tracking conditions during 1997–1998 and 1998–1999 making hunting difficult.

Population Composition

We have no survey data or information to determine the composition of the wolf population in Unit 23.

Distribution and Movements

Wolves occupy all potential habitat in Unit 23. The movements and distribution of wolves are influenced by caribou, especially during the winter (Ballard 1993). During this reporting period significant numbers of caribou overwintered in the upper Kobuk River.

MORTALITY

Harvest

Season and Bag Limit. There were no changes in the season and bag limit for wolves during this reporting period.

Unit and Bag Limits	1996–1997 to 1998–1999	
	Resident Open Season (Subsistence and General Hunts)	Nonresident Open Season
Unit 23		
Residents and Nonresidents:		
Trapping - no limit	1 Nov–15 Apr	1 Nov–15 Apr
Hunting - 5 wolves	10 Aug–30 Apr	10 Aug–30 Apr

Board of Game Actions and Emergency Orders. The Board of Game did not take any action that affected wolf hunting or trapping in the Unit 23. However, the state Legislature and voters acted on several issues during the reporting period. During the 1997 legislative session a bill (HB 26) passed which decreased the nonresident tag fee to \$30.00 and the nonresident alien wolf tag fee to \$50.00. The new tag fees became effective January 1, 1998. In November 1997

state voters passed a Ballot Measure 3, which restricted wolf control programs and prohibited the use of aircraft for hunting and trapping the same day they were used for transport. This change became effective Feb 25, 1998. The previous restriction, requiring trappers to be 300 ft from the aircraft before shooting, had been in effect since the 1994–1995 regulatory year. A ballot initiative that would have eliminated use of snares for trapping wolves was defeated during November 1998.

Hunter/Trapper Harvest. Hunters reported harvesting 61 wolves during 1996–1997, 23 during 1997–1998, and 30 during 1998–1999 (Table 1). The lower harvests in 1997–1998 and 1998–1999 are attributed to late snow and poor tracking and travel conditions. Hunters continued to harvest wolves most heavily in the Kobuk River drainage, but also took wolves on the northern Seward Peninsula, Noatak and Selawik river drainages (Table 2). Wolf harvest patterns on the northern Seward Peninsula are related to recent overwintering of caribou on the peninsula.

We estimate less than 10% of the actual wolf harvest is reported by local residents. Recent community harvest assessment studies (Georgette 1999) indicate this percentage may be even lower. One wolf was reported taken by upper Kobuk River residents through the department's sealing program. This is in contrast to 18 wolves reported during household interviews of just one village. Local use of hides, low compliance with license requirements, and confusion over sealing requirements contribute to low reporting rates for furbearers in Unit 23.

Permit Hunts. There were no permit hunts for wolves in Unit 23 during the reporting period.

Hunter Residency and Success. Twenty-three hunters reported harvesting wolves in 1996–1997. Two hunters were nonresidents, 1 was a nonlocal Alaska resident; and the rest were residents of Unit 23. Of 12 hunters in 1997–1998, 9 were local residents, 2 were nonlocal residents and 1 was a nonresident. In 1998–1999, 10 local residents, 2 nonlocal residents (Shishmaref and Anchorage) and 1 nonresident reported harvesting wolves. All nonresident hunters harvested wolves opportunistically in the fall under a hunting license.

Harvest Chronology. Most wolves were harvested during the winter and early spring (December through March) (Table 3). Despite the lower harvest in 1997–1998 and 1998–1999, the annual chronology of harvest did not vary. The only wolves taken outside this time period tended to be by the few nonresidents who took wolves while hunting moose or caribou.

Transport Methods. Hunters primarily used snowmachines to harvest wolves (Table 4). As expected, use of aircraft was minimal following closure of Unit 23 to same-day-airborne wolf hunting. Some individuals continued to use aircraft to shoot wolves incidental to other hunting activities. Ground shooting rather than trapping continues to be the most common method to harvest wolves in Unit 23 (Table 5).

Other Mortality

There were no reports of wolf mortality due to causes other than hunting or trapping. The last documented outbreak of rabies in wolves was 1989–1990. Without ongoing studies we doubt we would be able to detect the occurrence of a rabies outbreak in Unit 23 wolves.

An outbreak of canine distemper in the winter of 1996–1997 killed approximately 200–300 dogs in the region. Symptoms were first reported in sled dogs outside of Kotzebue. An aggressive vaccination program began and was thought to be responsible for containing the outbreak to the Kotzebue vicinity. The village of Noatak experienced no distemper outbreak during the winter months when mortality was highest in Kotzebue, but did have several cases 5 months later (June). This indicated that either the outbreak had not been contained or a wild host existed. Canine distemper is a highly contagious virus (Zarnke 1981). Natural transmission occurs primarily through direct contact of body fluid. Known hosts include; dogs, foxes, wolves, weasels, mink, marten, otter, and bear. Stephenson (1982) documented the presence of distemper in wolves in arctic regions. The suspected mortality rate for wolves exposed to the disease is over 50%. We know distemper can be transmitted between foxes and dogs (Don Ritter, Alaska State Public Health Lab, Fairbanks Alaska, personal communication). It is possible wolves were affected by this distemper outbreak.

HABITAT

Assessment and Enhancement

There were no habitat assessment activities or habitat enhancement projects for wolves in Unit 23 during the reporting period.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

There were no nonregulatory management issues to report related to wolves in Unit 23 during the reporting period.

CONCLUSIONS AND RECOMMENDATIONS

Previous federal restrictions eliminated the practice of same-day-airborne hunting of wolves in over 60% of Unit 23 before restrictions in state regulations were imposed. Elimination of hunting wolves with aircraft has changed the pattern and level of harvest. Now, fewer wolves are taken by hunters using snowmachines typically within a day's travel of the region's villages. The greatest reduction in harvest resulting from this change is in remote areas such as the upper Noatak River.

We recommend a continued effort be placed on monitoring rabies and encouraging investigators to explore the relationship between canine distemper and wolf population dynamics. With high ungulate populations in Unit 23 (primarily caribou) diseases such as rabies, distemper and parvovirus are likely to significantly affect wolf numbers.

Since harvest of wolves in Unit 23 is primarily by snowmachine, it will continue to be greatly influenced by snow and travel conditions. Extrapolating harvest data to other years should be done with caution. Hunting conditions should be documented along with harvest.

LITERATURE CITED

BALLARD, WB 1993. Demographics, movements, and predation rates for wolves in northwest Alaska. Ph.D. Thesis, University Arizona, Tucson, Arizona USA. 374pp.

- CARBYN, LN, SH FRITTS AND DR SEIP 1995. Ecology and Conservation of Wolves in a Changing World. Canadian Circumpolar Institute, Occasional Publication No. 35, 642pp.
- GEORGETTE, S 1999. Subsistence Harvests in northwest Alaska: Caribou, Moose, Bear, Wolf and wolverine. May 1998 through April 1999. Alaska Department Fish and Game, Division of Subsistence, Kotzebue Alaska USA.
- McKNIGHT, DE 1973. The history of predator control in Alaska. Alaska Department Fish and Game Report. Juneau Alaska USA. 11pp.
- SPAULDING, RL 1996. Diet and observer bias in scat analysis of gray wolves. M.Sc. Thesis. University Arizona, Tucson, Arizona USA. 95pp.

PREPARED BY:

Lee Anne Ayres
Wildlife Biologist II

SUBMITTED BY:

Peter J. Bente
Survey-Inventory Coordinator

REVIEWED BY:

Jim Dau
Wildlife Biologist III

Table 1 Reported wolf harvest from sealing certificates for Unit 23, 1974–1975 through 1998–1999

Regulatory year	Males	Females	Unknown	Total
1974–1975	–	–	50	50
1975–1976	–	–	142	142
1976–1977	–	–	157	157
1977–1978	–	–	65	65
1978–1979	–	–	50	50
1979–1980	12	6	0	18
1980–1981	33	17	0	50
1981–1982	10	7	0	17
1982–1983	25	19	4	48
1983–1984	30	14	2	46
1984–1985	45	20	0	65
1985–1986	10	8	1	19
1986–1987	23	10	1	34
1987–1988	52	33	9	94
1988–1989	42	36	5	83
1989–1990	27	25	5	57
1990–1991	17	15	13	45
1991–1992	30	22	6	58
1992–1993	28	32	11	71
1993–1994	30	17	3	50
1994–1995	24	19	10	53
1995–1996	35	25	3	63
1996–1997	30	18	13	61
1997–1998	6	12	5	23
1998–1999	11	10	9	30

Table 2 Wolf harvest by drainage in Unit 23, 1974–1975 through 1998–1999

Regulatory year	Kivalina	Noatak	Kobuk	Selawik	N. Seward	Unknown	Total
1974–1975	3	5	22	20	0	0	50
1975–1976	2	9	78	53	0	0	142
1976–1977	0	26	28	82	1	10	157
1977–1978	0	3	25	20	1	70	65
1978–1979	7	4	11	15	1	30	50
1979–1980	1	2	9	4	2	0	18
1980–1981	2	3	11	24	3	7	50
1981–1982	1	10	3	3	0	0	17
1982–1983	1	11	6	21	8	1	48
1983–1984	0	9	7	21	7	2	46
1984–1985	1	16	20	21	3	4	62
1985–1986	0	11	4	2	2	0	19
1986–1987	2	5	6	18	0	2	34
1987–1988	0	27	41	11	15	0	94
1988–1989	1	12	28	39	0	3	83
1989–1990	3	10	27	2	15	0	57
1990–1991	0	7	18	15	5	0	45
1991–1992	2	8	30	4	13	1	58
1992–1993	2	11	30	15	4	9	71
1993–1994	0	17	28	3	2	0	50
1994–1995	1	12	26	7	7	0	53
1995–1996	0	11	27	18	7	0	63
1996–1997	6	9	24	15	7	0	61
1997–1998	0	2	17	0	0	4	23
1998–1999	0	6	12	1	10	0	30

Table 3 Chronology of wolf harvest for Unit 23 from 1993–1994 through 1998–1999

Reg. year	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Unknown	Total
1993–1994	1	2	0	3	11	7	5	6	10	5	50
1994–1995	0	1	0	10	3	8	8	14	9	0	53
1995–1996	0	2	0	6	5	2	1	37	9	1	63
1996–1997	0	2	2	4	14	7	12	14	0	6	61
1997–1998	0	1	0	0	5	0	5	2	6	4	23
1998–1999	0	2	0	1	5	6	7	7	1	1	30

Table 4 Number of hunters and method of transport to harvest wolves in Unit 23, 1985–1986 through 1998–1999

Reg. year	Hunters	Airplane	Snowmachine	Boat	Unk.	Dogteam	Total harvest
1985–1986	12	8	7	0	4	0	19
1986–1987	17	20	9	0	5	0	34
1987–1988	32	48	40	2	4	0	94
1988–1989	29	10	70	0	3	0	83
1989–1990	25	11	32	2	12	0	57
1990–1991	23	4	32	0	9	0	45
1991–1992	25	9	47	0	2	0	58
1992–1993	24	2	69	0	0	0	71
1993–1994	24	2	44	0	4	0	50
1994–1995	21	1	52	0	0	0	53
1995–1996	20	1*	62	1	0	0	63
1996–1997	23	5	48	3	0	5	61
1997–1998	12	1	18	0	4	0	23
1998–1999	13	2	28	0	0	0	30

*boat also used

Table 5 Methods of harvesting wolves in Unit 23, 1985–1986 through 1998–1999

Reg. year	Ground shooting	Trapping	Snaring	Unknown	Total harvest
1985–1986	14	2	0	3	19
1986–1987	26	4	0	4	34
1987–1988	90	2	0	2	94
1988–1989	72	9	0	2	83
1989–1990	45	8	0	4	57
1990–1991	32	3	3	7	45
1991–1992	43	7	0	8	58
1992–1993	69	2	0	0	71
1993–1994	44	4	0	2	50
1994–1995	41	12	0	0	53
1995–1996	42	19	0	2	63
1996–1997	50	11	0	0	61
1997–1998	12	7	0	4	23
1998–1999	20	8	0	2	30

LOCATION

GAME MANAGEMENT UNIT: 24 (26,055 mi²)

GEOGRAPHIC DESCRIPTION: Koyukuk River drainage above Dulbi River

BACKGROUND

Wolves are present throughout Unit 24. Historically, abundance in Unit 24 fluctuated in response to the availability of prey and, more recently, to human harvest of wolves. Numbers were low in the Brooks Range during the late 1800s because densities of moose, caribou, and Dall sheep were low (Campbell 1974). Prey populations increased during the early 1900s, leading to concurrent increases in wolf numbers. Now wolves are more numerous than in the 1970s but probably not as abundant as during the 1940–1950s (Woolington 1997).

There were probably fewer wolves in the southern portion of the unit before the 1940s than exist now because a stable prey base was absent. At that time, moose populations were still expanding into this area, and the availability of caribou varied widely between years. Federal wolf control efforts probably reduced the limiting effect of wolf predation on local moose populations, and moose numbers increased rapidly. When wolf control ceased, the abundance of moose allowed wolf numbers to increase. Wolf numbers are presently as high in southern Unit 24 as at any known time.

Reported wolf harvests during 1988–1998 were 30–119 wolves per year and averaged 72 wolves annually. The local demand for wolf pelts used as parka ruffs and gifts at funeral potlatches has traditionally been high. Additionally, local residents of the area perceive wolves as direct competitors for moose and often make a conscious effort to increase the wolf harvest when moose seem scarce.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Wolf populations will be managed to provide for human uses and to ensure that wolves remain an integral part of Interior Alaska's ecosystems. Compatible human uses include hunting and trapping (both for personal use and commercial sale of furs), photography, viewing, listening, and scientific and educational purposes. The aesthetic value of being aware of or observing wolves in natural interactions with their environment is also recognized as an important human use of wolves. The domestication of wolves for personal use or for commercial purposes is generally considered incompatible with department management policies.

Management may include both manipulation of wolf population size and total protection of wolves from human influence. Not all human uses will be allowed in all areas or at all times; management will focus on providing sustained, diverse human uses of wolf populations consistent with goals listed in the Wolf Conservation and Management Policy for Alaska,

adopted by the Alaska Board of Game 30 October 1991 and revised 29 June 1993. Those goals are listed below:

- Ensure long-term conservation of wolves throughout their historic range in Alaska in relation to their prey and habitat.
- Provide for the broadest possible range of human uses and values of wolves and their prey populations that meet wildlife conservation principles and which reflect the public's interest.
- Increase public awareness and understanding of the uses, conservation and management of wolves, their prey, and habitat in Alaska.

MANAGEMENT OBJECTIVES

During the reporting period 1 July 1993–30 June 1996, the following objectives were in place:

- In the southern part of Unit 24 (south of Hughes; 6150 mi²), the objective is to manage a stable fall wolf population with a density of approximately 21 wolves/1000 mi² (8 wolves/1000 km²) to sustain an annual harvest of approximately 30 wolves.
- In the central part of the unit (Hughes to Bettles), reduce wolf density to 10 wolves/1000 mi² (4 wolves/1000 km²) to achieve a moose:wolf ratio of 50:1.
- In the northern part of the unit (north of Bettles including Gates of the Arctic National Park (GAAR), maintain a stable fall wolf density of approximately 21 wolves/1000 mi² (8 wolves/1000 km²), to sustain an annual harvest of 30 wolves, while providing for nonconsumptive uses within the GAAR.

Woolington (1997) proposed modification of those management objectives to more accurately reflect the current regulations and policies regarding wolf management in Unit 24. The Board of Game did not adopt an implementation plan for control of wolf predation. Therefore, management was directed to maintain a sustainable harvest and accommodate nonconsumptive uses. Wolf population fluctuations were expected as wolves responded to change in the availability of their ungulate prey. Management objectives and related activities for this reporting period are listed below:

- Provide for a sustained annual harvest rate of no more than 30% from the combined wolf population of Unit 24.
- Monitor harvest through sealing records and trapper questionnaires.
- Monitor wolf numbers and population characteristics through interviews with trappers, hunters, pilots, and by evaluation of sealing documents.
- Conduct an aerial survey to estimate wolf pack sizes and number of packs in central Unit 24 during late winter 1998.

- Participate in trapper education to enhance trapper skills and ethics and to increase regulatory compliance.
- Cooperate with ongoing wolf studies conducted by the US Fish and Wildlife Service (FWS).
- Model the potential range of effects of wolf predation on ungulates in each subunit.

METHODS

We worked cooperatively with FWS to estimate the late winter wolf population and pack size using aerial surveys. In March 2000, a Sample Unit Probability Estimator (SUPE) survey (Becker et al. 1998) was conducted in the southern portion of Unit 24. The probability of sighting wolf tracks after a fresh snowfall was used to obtain population estimates. Once tracks were sighted they were followed until wolves were sighted and counted (ADF&G files, Galena, 5 May 2000). Population data were summarized by regulatory year (RY = 1 Jul through 30 Jun, e.g., RY99 = 1 Jul 1999 through 30 Jun 2000).

A wolf reconnaissance survey was flown in a limited area of Unit 24 and the northern portion of Unit 21D in March 1999 using SUPE methodology. However, we were unable to satisfy assumptions required for application of the technique because of poor snow conditions. Therefore, a minimum estimate for the area was developed from that survey (ADF&G files, Galena, 7 May 1999).

Wolves harvested by trappers and hunters were sealed to monitor harvest. Information recorded for each wolf included date of kill, name of trapper or hunter, location of kill, method of take and transportation, sex of the wolf, color of the pelt, and the number of other wolves thought to be in the pack. Trapper interviews were also used to monitor harvest. Data were summarized by regulatory year.

We conducted wolf snaring and trapper education courses during RY99 in local villages to improve trapper skills and knowledge of wildlife management issues.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Wolves are throughout the unit in all habitat types and often near human settlements. The number of wolves varies, depending on availability of prey. There are more wolves in the south and north than in the central portion of the unit, which has lower moose densities and more sporadic movements of caribou.

A series of geographically overlapping surveys completed during late winters 1994 through 2000 indicated the wolf population may have increased in the southern portion of Unit 24 and adjacent Unit 21D. The SUPE survey completed during March 2000 in the southern portion of Unit 24 indicated there were 148 wolves (± 32 , 90% CI) over a 4175 mi² survey area for a

density of 36 wolves/1000 mi² (14 wolves/1000 km²). The reconnaissance survey completed during March 1999 in southern Unit 24 and adjacent Unit 21D indicated a density of 32 wolves/1000 mi² (12 wolves/1000 km²). A 1994 survey in adjacent Unit 21D indicated a density of 23 wolves/1000 mi² (9 wolves/1000 km²)

During RY95, the estimated Unit 24 fall population was 405–540 wolves (Table 1). It was derived by plotting known pack locations and by assuming a density of 15–21wolves/1000 mi² (6–8 wolves/1000 km²) for unknown areas. No new information about unknown areas was obtained during this reporting period. Therefore, the same density was used for these areas when we estimated the unitwide population during RY96–RY99.

The unitwide fall population likely did not change during RY96–RY99. In the northern portion of the unit, there were likely 155–206 wolves, with a density of 6–8 wolves/1000 km². In the central portion of the unit there were probably 103–155 wolves, with a density of 4–6 wolves/1000 km². In southern Unit 24 the SUPE indicated 116–180 wolves. Therefore, the estimated fall population for the entire unit was 374–541 during the reporting period.

DISTRIBUTION AND MOVEMENTS

Radiotelemetry of wolves in the Kanuti National Wildlife Refuge indicated that 85–100 wolves in 9–11 packs used the refuge during fall (Zirkle 1995). Packs roamed over 2556–4059 mi², and average pack size was 4. All wolves that were pups or yearlings when collared, dispersed from the area and were not followed.

Packs are known to migrate into Unit 24 during the winter with the Western Arctic caribou herd. These wolves are mostly found in GAAR and in the Upper Huslia and Hogatza Rivers (D James, ADF&G, personal communication). Unpredictability of these migrations is responsible for most of the variation of the wolf population estimates for the GAAR portion of the unit.

MORTALITY

Harvest

Seasons and Bag Limits.

Units and Bag Limits	Resident Open Seasons	Nonresident Open Seasons
Unit 24		
HUNTING: 5 wolves.	10 Aug–30 Apr	10 Aug–30 Apr
TRAPPING: No limit.	1 Nov–30 Apr	1 Nov–30 Apr

Board of Game Actions and Emergency Orders. At their 1993 meeting, the board continued the ban on same day hunting of wolves, but allowed taking wolves the same day as airborne under trapping regulations, provided the trapper moved 300 feet from the aircraft before taking a free-ranging wolf. Beginning RY97, the provision of same-day airborne harvest was

eliminated in the trapping regulations as well. Beginning RY95, the trapping season was extended through April. Wolves could be taken under either hunting or trapping regulations.

Hunter/Trapper Harvest. Hunters and trappers reported harvesting 88, 56, and 36 wolves during RY96, RY97 and RY98, respectively (Table 2). The actual number harvested was probably higher because most village residents seal only those wolf pelts that are sent to a commercial tannery or sold to a fur buyer. Hunting and trapping conditions vary from year to year, which effects harvests. Under good conditions the estimated unreported harvest can be up to 80 wolves/year, but under poor conditions unreported take can be 50 wolves/year (Woolington 1997).

Harvest Chronology. Wolves were generally taken in January, February, and March during RY94–RY98 (Table 3). The exception was RY97 when November and December were also important months. Like nearby Unit 21D, incidental harvest in the fall increased slightly, possibly due to increased sightings during the fall moose season.

Transport Methods. Most wolves were taken using snowmachines for transportation during RY94–RY98 (Table 4). No other trends in transportation methods were apparent.

CONCLUSIONS AND RECOMMENDATIONS

The unitwide wolf population was stable during this reporting period and has shown little change since RY93. However, numbers in various sections of the unit probably fluctuated. Wolf numbers were highest and probably increased in the southern portion of the unit (south of Hughes). They were moderate and stable in the central portion of the unit (Bettles to Hughes), and variable with some declines in the north (north of Bettles).

Our objective to provide for a sustained annual harvest rate of no more than 30% of the unitwide population was met during RY97 and RY98. However, during RY96 harvest was 27–40% of the population.

Most other management objectives were met during the reporting period. Harvest monitoring was an important part of the wolf management program. It included the statewide sealing system, trapper questionnaires, and trapper interviews. Trapper education courses were also effective. Wolves were radiocollared and tracked by the Kanuti NWR during the reporting period. We cooperated with the FWS in those efforts. An aerial wolf survey was planned but not completed in the central portion of the unit due to persistently poor survey conditions. Finally, although a definitive model of wolf predation dynamics was not fully completed, we applied the PredPrey computer model (McNay and DeLong 1998) in several scenarios. Work with the PredPrey model will be continued.

I recommend an aerial survey be conducted to determine wolf densities in the central portion of Unit 24. I also recommend continued monitoring of radiocollared packs in the Kanuti area to improve population estimates and to provide information on predation rates. Additionally, I recommend federal and state biologists work closely with local residents to improve harvest reporting compliance.

The management goals, objectives, and activities for the next reporting period will be as listed:

MANAGEMENT GOALS

- Ensure long-term conservation of wolves throughout their historic range in Alaska in relation to their prey and habitat.
- Provide for broadest possible range of human uses and values of wolves and their prey populations that meet wildlife conservation principles and which reflect the public's interest.
- Increase public awareness and understanding of uses, conservation and management of wolves, their prey, and habitat in Alaska.

MANAGEMENT OBJECTIVES

- Maintain a fall density of 13–23 wolves/1000 mi² (5–9 wolves/1000 km²).
- Provide for a total annual harvest of 112–162 wolves.
- Increase trapper participation in statewide trapper survey by at least 1% annually.

MANAGEMENT ACTIVITIES

- Conduct surveys to estimate population size and density.
- Model the potential effects of wolf predation on ungulates in each unit.
- Monitor harvest through sealing records and trapper questionnaires.
- Monitor wolf numbers and population characteristics through interviews with trappers, hunters, pilots, and by evaluation of sealing documents.
- Conduct trapper education clinics.

LITERATURE CITED

- BECKER EF, MA SPINDLER, AND TO OSBORNE. 1998. A population estimator based on network sampling of tracks in the snow. *Journal of Wildlife Management* 62:968–977.
- CAMPBELL JM. 1974. Effects of late prehistoric and early historic Eskimo hunting of Dall sheep in North Alaska: examples of aboriginal overkill. Proceedings biennial northern wild sheep and goat council. Montana Department of Fish and Game. pp. 108–126.
- MCNAY ME AND RA DELONG. 1998. Development and testing of a general predator-prey computer model for use in making management decisions. Alaska Department of Fish

and Game. Federal Aid in Wildlife Restoration. Final Research Report. Study 1.46. Grants W-24-1 and W-24-5. Juneau, Alaska USA.

WOOLINGTON JD. 1997. Unit 24 wolf management report. Report of survey-inventory activities. Pages 164–170 *in* MV Hicks, editor. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Grants W-24-2, W-24-3, and W-24-4. Study 14.0. Juneau, Alaska USA.

ZIRKLE AH. 1995. A population assessment of wolves and an account of the predator/prey relationship on Kanuti National Wildlife Refuge. US Fish and Wildlife Service Report, Kanuti National Wildlife Refuge, November 1995.

PREPARED BY:

Glenn W Stout
Wildlife Biologist II

SUBMITTED BY:

Roy A Nowlin
Regional Management Assistant

REVIEWED BY:

Mark E McNay
Wildlife Biologist III

Table 1 Unit 24 fall wolf population estimates^a, regulatory years 1988–1989 through 1999–2000

Regulatory year	Population estimate ^b	Number of packs
1988–1989	420–450	55–60
1989–1990	400–440	55–60
1990–1991	400–440	55–60
1991–1992	420–450	68–70
1992–1993	388–415	51–55
1993–1994	405–540	58–66
1994–1995	405–540	58–66
1995–1996	405–540	58–66
1996–1997	374–541	58–66
1997–1998	374–541	58–66
1998–1999	374–541	58–66
1999–2000	374–541	58–66

^a Fall estimate = pretrapping season population.

^b Basis of estimate: Alaska Department of Fish and Game, National Park Service, and US Fish and Wildlife Service aerial surveys; hunter/trapper reports; sealing records; and incidental observations.

Table 2 Unit 24 wolf harvest, regulatory years 1988–1989 through 1998–1999

Regulatory year	Reported harvest				Estimated unreported harvest	Total estimated harvest	Method of take			
	M	F	Unk	Total			Trap/snare	Shot	SDA ^a	Unk
1988–1989	38	32	6	76	50	126	16	20	39	1
1989–1990	17	9	4	30	60	90	25	3	0	2
1990–1991	16	24	2	42	60	102	22	20	0	0
1991–1992	42	39	4	85	55	140	70	15	0	0
1992–1993	41	32	6	79	80	159	43	35	1	0
1993–1994	48	37	4	89	60	149	62	27	0	0
1994–1995	52	28	9	89	60	149	68	14	6	1
1995–1996	52	55	12	119	60	179	88	29	2	0
1996–1997	45	38	5	88	60	148	73	13	0	2
1997–1998	32	20	4	56	50	106	46	9	0	1
1998–1999	19	12	5	36	50	86	31	5	0	0

^a Animals taken by hunters the same day hunters or trappers were airborne.

Table 3 Unit 24 wolf harvest chronology percent by month, regulatory years 1991–1992 through 1998–1999

Regulatory year	Harvest periods							n ^a
	Aug–Oct	Nov	Dec	Jan	Feb	Mar	Apr	
1991–1992	7	14	18	22	25	8	6	85
1992–1993	3	1	8	7	32	50	0	92
1993–1994	7	7	20	10	25	26	7	92
1994–1995	7	6	8	18	33	27	1	83
1995–1996	7	13	21	13	25	8	13	107
1996–1997	8	10	15	22	30	16	0	88
1997–1998	9	15	35	15	20	7	0	55
1998–1999	6	11	17	22	22	22	0	36

^a Includes harvest records received after total harvest was calculated.

Table 4 Unit 24 wolf harvest percent by transport method, regulatory years 1991–1992 through 1998–1999

Regulatory year	Percent of harvest								n ^a
	Airplane	Dogsled, Skis, Snowshoes	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unk	
1991–1992	18	51	32	0	0	0	0	0	85
1992–1993	3	0	0	0	89	1	4	2	92
1993–1994	3	4	3	0	83	0	1	5	92
1994–1995	16	0	6	1	73	0	3	1	88
1995–1996	3	7	2	2	69	3	4	10	107
1996–1997	3	0	3	0	90	0	1	2	88
1997–1998	4	5	2	0	86	0	2	2	56
1998–1999	0	3	6	3	72	0	17	0	36

^a Includes harvest records received after total harvest was calculated.

LOCATION

GAME MANAGEMENT UNIT: 25A, 25B, 25D, 26B, and 26C (73,756 mi²)

GEOGRAPHIC DESCRIPTION: Eastern Interior, Eastern Brooks Range, and Central and Eastern Arctic Slope

BACKGROUND

Wolves are throughout the management area. They are well adapted to living in the Interior taiga forests, the rugged mountains of the Brooks Range, and the arctic slope tundra. Wolves are generally less abundant than in other parts of the Interior because populations of resident prey such as moose are scarce in many areas.

Relatively little is known about wolf populations or their influence on ungulate populations in northeastern Alaska. US Fish and Wildlife Service (FWS) biologists studied the movements and denning habits of 11 wolf packs in the northern Arctic National Wildlife Refuge (ANWR) in Unit 26C in 1984 and 1985 (Garner and Reynolds 1986). Subsequent aerial surveys and incidental observations further documented widespread presence of wolves within ANWR and to the west in Unit 26B. However, no systematic surveys were conducted within the area. Nowlin (1985) flew aerial wolf surveys in Unit 25D West in March 1984. Wolf surveys covering portions of Unit 25D were done in March 1992, 1997 and 1999, and in 25D and part of Unit 25B in 2000, but no surveys were conducted in Unit 25A.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

Wolf populations will be managed to provide for human uses and to ensure that wolves remain an integral part of Interior Alaska's ecosystems. Compatible human uses include hunting and trapping (both for personal use and commercial sale of furs), photography, viewing, listening, and scientific and educational purposes. The aesthetic value of being aware of or observing wolves in natural interactions within their environment is also recognized as an important human use of wolves. The domestication of wolves for personal or commercial purposes is generally considered incompatible with department management policies.

Management may include manipulation of wolf population size and total protection of wolves from human influence. All human uses might not occur in all areas or at all times; management will focus on providing sustained, diverse human uses of wolf populations consistent with goals listed in the Wolf Conservation and Management Policy for Alaska, adopted by the Alaska Board of Game 30 October 1991 and revised 29 June 1993. These goals are listed below:

- Ensure the long-term conservation of wolves throughout their historic range in Alaska in relation to their prey and habitat.

- Provide for the broadest possible range of human uses and values of wolves and their prey populations that meet wildlife conservation principles and that reflect the public's interest.
- Increase public awareness and understanding of the uses, conservation, and management of wolves, their prey, and habitat in Alaska.

MANAGEMENT OBJECTIVES

The Board of Game has not adopted an implementation plan for control of wolf predation in any of these units, although this may occur in the future. Therefore, management is currently directed at maintaining a sustainable harvest and accommodating nonconsumptive uses of wolves. Fluctuations in wolf populations are expected as numbers respond to changes in the availability of ungulate prey and other environmental factors. Objectives during this reporting period are listed below (see page 248 of this report).

- Conduct a wolf census in Units 25A, 25D East, and 25D West by 1999.
- Using computer modeling, evaluate effects of wolf predation on moose in Unit 25D.

METHODS

Population estimates in Unit 25 were based on aerial track surveys completed late winter 1983, 1984, 1992, 1996, 1998 and 2000. Population estimates in a large part of Units 25A, 25B, 26B and 26C were based on earlier surveys, incidental observations of wolves by agency personnel and the public, and extrapolation of survey results. Aerial track surveys were conducted during late winter with PA-18 Super Cub or Scout aircraft flown at 400–500 ft above ground level and generally occurred 3–5 days after snowfall.

Wolves harvested by trappers and hunters were sealed to monitor harvest. Information recorded for each wolf included date and location of kill, name of trapper or hunter, method of take and transportation, sex of the wolf, color of the pelt, and the number of other wolves thought to be in the pack. Data were summarized by regulatory year (RY = 1 Jul through 30 Jun, i.e., RY99 = 1 Jul 1999 through 30 Jun 2000).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population density is low relative to other parts of the Interior where prey are more abundant. Wolf populations in Units 25A, 25B, 25D, 26B and 26C appeared to be relatively stable, but data on population trends are limited, except in Unit 25D.

Population Size

Estimates from surveys, hunter observations, and harvest data indicated that 65–85 packs, including 470–570 wolves, were present in Units 25A, 25B, and 25D in fall 1988. These

estimates were increased to 72–93 packs including 520–634 wolves in fall 1992. They are still considered representative, based in part on the results of recent surveys in Unit 25.

Wolf population density in western Unit 25D was estimated at 7.3–9.1 wolves/1000 mi² (2.8–3.5 wolves/1000 km²) in 1983 and 1984 (Nowlin 1985). A 1992 aerial survey encompassing most of Unit 25D indicated wolf density averaged about 8.8–10.6 wolves/1000 mi² (3.4–4.1 wolves/1000 km²). Aerial surveys in 1997 and 1999 resulted in estimates of 12.2–14.5 wolves/1000 mi² (4.7–5.6 wolves/1000 km²) in 25D West, and 9.6–11.1 wolves/1000 mi² (3.7–4.3 wolves/1000 km²) in western and central 25D. Average pack size was 5–7 wolves in most of the area.

A March 2000 survey indicated there were at least 125–133 wolves in 13,800 mi² (35,700 km²) in southern Unit 25B and eastern Unit 25D, or a density of 9.1–9.8 wolves/1000km² (3.5–3.8 wolves/1000 km²). Groups included 1–13 wolves and averaged 4.6. Excluding 6 groups numbering <3 wolves resulted in an average estimated pack size of 5.3 ($n = 23$). A total of 65 wolves (26 black and 39 gray or white) were observed.

There were an estimated 150–215 wolves in 22–32 packs in Units 26B and 26C, indicating a fall wolf density of 5.7–8.3 wolves/1000 mi² (2.2–3.2 wolves/1000 km²). Resident packs are rare on the coastal plain in the northern portion of these subunits (Garner and Reynolds 1986).

Distribution and Movements

Radiocollared wolves in northern ANWR were members of packs in the Canning, Sadlerochit, Aichilik, Kongakut, Hulahula, Egaksrak, Drain, and Malcom drainages (Garner and Reynolds 1986). Several lone wolves were also radiocollared. Relocations indicated wolves did not follow caribou to their winter ranges but generally remained within the same pack territories all year. Wolves preyed primarily on caribou from spring to fall but switched to Dall sheep, moose, and small game in winter when caribou were not present. Several wolves dispersed as far as 500 miles from their home range (Garner and Reynolds 1986).

MORTALITY

Harvest

Season and Bag Limit. The hunting season in Units 25 and 26 was open from 10 August through 30 April. The bag limit was 5 wolves in Unit 25 and 10 in Unit 26; however, same-day-airborne hunting of wolves was prohibited.

Units/Bag Limits/Special Restrictions	Resident/Subsistence Open Season	Nonresident Open Season
<i>RY93</i>		
Units 25A, 25B, and 25D		
HUNTING: 5 wolves.	10 Aug–30 Apr	10 Aug–30 Apr
TRAPPING: No limit.	1 Nov–31 Mar	1 Nov–31 Mar
Units 26B and 26C		

Units/Bag Limits/Special Restrictions	Resident/Subsistence Open Season	Nonresident Open Season
HUNTING: 10 wolves. TRAPPING: No limit.	10 Aug–30 Apr 1 Nov–15 Apr	10 Aug–30 Apr 1 Nov–15 Apr
<i>RY94</i>		
Units 25A, 25B, and 25D		
HUNTING: 5 wolves. TRAPPING: No limit.	10 Aug–30 Apr 1 Nov–30 Apr	10 Aug–30 Apr 1 Nov–30 Apr
Units 26B and 26C		
HUNTING: 10 wolves. TRAPPING: No limit.	10 Aug–30 Apr 1 Nov–30 Apr	10 Aug–30 Apr 1 Nov–30 Apr

* All units: Wolves could be taken by shooting same day airborne if caught in a trap or snare.

RY95–RY98

Units 25A, 25B, and 25D		
HUNTING: 5 wolves. TRAPPING: No limit.	10 Aug–30 Apr 1 Nov–30 Apr	10 Aug–30 Apr 1 Nov–30 Apr
Units 26B and 26C		
HUNTING: 10 wolves. TRAPPING: No limit.	10 Aug–30 Apr 1 Nov–30 Apr	10 Aug–30 Apr 1 Nov–30 Apr

* All units: Wolves could be taken by shooting same day airborne if caught in a trap or snare.

Board of Game Actions and Emergency Orders. The Board of Game took no actions and no emergency orders were issued during this reporting period.

Hunter/Trapper Harvest. Annual wolf harvests in the reporting area were relatively stable during RY96–RY98 (51–71) (Table 1). Most of the harvest occurred in Units 25A and 25D. Harvests in both areas were moderate compared to historic levels. The Unit 26B harvest was relatively high in RY92 and RY94 but has subsequently declined. Few wolves were harvested in Unit 26C, probably because of limited access and low wolf density.

Wolves were reported taken in scattered locations in Unit 25 including parts of the Coleen, Sheenjek, Hodzana, and Chandalar drainages in Unit 25A; the Black and Porcupine drainages in Unit 25B; and in the Birch, Beaver, Hodzana, Porcupine, and Yukon drainages in Unit 25D. In Unit 26B wolves were taken at scattered locations near the trans-Alaska pipeline corridor from the Atigun River north to Sagwon. Wolves harvested in Unit 26C were taken on

the Canning River and in various drainages south of Barter Island. Harvests generally included more males than females. Some unreported harvest occurs, primarily in Units 26B and 26C, where hides are often used in clothing and handicrafts (Whitten 1988).

In Units 26B and 26C, wolves were taken primarily by shooting from the ground. Most wolves harvested in Unit 25 were taken with traps or snares. The occurrence of snared and trapped wolves in the harvest has changed little over the years. However, the proportion taken by the land-and-shoot method involving aircraft has changed. This was the predominant harvest method before the 1988 prohibition on same-day-airborne hunting.

Harvest Chronology. Most reported wolf harvest occurred from November through March, although a few wolves were taken in August or September (Table 2).

Transport Methods. Over most of the reporting area, snowmachines were the most common method of access, and their use has changed little over the years (Table 3). In Unit 26B most hunters and trappers used highway vehicles to reach the area by the Dalton Highway. Individuals using snowmachines or aircraft took a few wolves.

Natural Mortality

The relatively low density of wolves in the reporting area is consistent with the relative scarcity of resident prey. Moose populations are generally at low density, and caribou are only seasonally abundant in certain areas because of their wide-ranging migrations.

Small packs, small litters, and low pup survival are characteristic of wolf populations in areas where prey are relatively scarce. Garner and Reynolds (1986) reported that 8 of 11 packs studied in ANWR included 5 or fewer wolves, with low pup production and survival. Summer pup survival rates for packs of <5 wolves were 23–25%, while larger packs had nearly 100% pup survival.

Predation by other wolves and rabies (Zarnke and Ballard 1987) are probably the major causes of natural mortality among adult wolves in northeastern Alaska. Rabies in wolves is generally confined to coastal areas in northern and western Alaska, including Units 26B and 26C.

CONCLUSIONS AND RECOMMENDATIONS

Wolves continue to be widely distributed in northeastern Alaska, and the number of wolves harvested was low relative to population size. Reported harvests accounted for no more than 7–11% of the estimated population in Units 25A, 25B, and 25D and 13–19% in Units 26B and 26C. Harvests were well below the maximum sustainable level of 30–35% generally reported for wolf populations. However, when ungulate:wolf ratios are low, as in Units 25 and 26, sustainable wolf harvests can be lower. Wolf population density continues to be relatively low compared to areas where prey is more abundant. I recommend continued monitoring of wolf populations, particularly in the most important moose hunting areas in Units 25B and 25D, in view of recent declines in moose populations on the north slope and in eastern Unit 25D and low sheep populations in the eastern Brooks Range, as well as generally low moose density in

other parts of the area. Likewise, the status of prey populations should be closely monitored in these areas.

The high number of predators relative to prey indicates that predation is a major factor affecting prey population dynamics. Population modeling exercises using the PredPrey model recently developed by Alaska Department of Fish and Game (McNay and DeLong 1998) were used to explore effects of predation by wolves and bears on moose populations on the Yukon Flats. These simulations indicate that wolf predation plays an important role in limiting moose numbers, which are likely to remain near a low-density equilibrium unless predation is reduced.

People throughout the study area and especially in Units 26B and 26C could be better informed of the requirement to seal wolf pelts. We should continue efforts to develop and maintain fur sealing officers in communities in the region.

Objectives during this reporting period were not quantifiable and, therefore, could not be readily evaluated. Those objectives were redefined as activities, additional activities were added, and a new objective was formulated. Therefore, during the next reporting period, management direction has been rewritten to include the following goals, objective, and activities:

MANAGEMENT GOALS

- Ensure the long-term conservation of wolves throughout their historic range in Alaska in relation to their prey and habitat.
- Provide for the broadest possible range of human uses and values of wolves and their prey populations that meet wildlife conservation principles and which reflect the public's interest.
- Increase public awareness and understanding of the uses, conservation and management of wolves, their prey, and habitat in Alaska.

MANAGEMENT OBJECTIVE

- Provide for a sustained annual harvest rate of no more than 30% from the combined wolf population of Units 25A, 25B, 25D; and no more than 30% of the combined wolf population of Units 26B and 26C.

MANAGEMENT ACTIVITIES

- Monitor harvest through sealing records and trapper questionnaires.
- Continue to evaluate the effects of wolf predation on moose in Unit 25D using computer modeling.
- Monitor wolf numbers and population characteristics outside survey areas through interviews with trappers, hunters, and pilots and by evaluation of sealing documents.

- Participate in trapper education to enhance trapper skills and ethics and improve compliance with regulations.
- Conduct periodic wolf population surveys in Units 25B, 25D East, and 25D West.

LITERATURE CITED

- GARNER GW AND PE REYNOLDS, editors. 1986. Gray wolf (*Canis lupus*). Pages 316–337 in Final report baseline study of the fish, wildlife, and their habitats. Volume I. Arctic National Wildlife Refuge Coastal Plain Resource Assessment, US Fish and Wildlife Service, Region 7, Anchorage, Alaska USA.
- MCNAY ME AND RA DELONG. 1998. Development and testing of a general predator-prey computer model for use in making management decisions. Alaska Department Fish and Game. Federal Aid in Wildlife Restoration. Final Research Report. Study 1.46. Grants W-24-1 and W-24-5. Juneau, Alaska USA.
- NOWLIN RA. 1985. Wolf management report of survey–inventory activities. Pages 40–42 in B Townsend, editor. Part XV. Volume XV. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Progress Report. Grant W-22-3. Study 14.0. Juneau, Alaska USA.
- WHITTEN KR. 1988. Wolf management report of survey–inventory activities. Page 64 in SO Morgan, editor. Part XV. Volume XVIII. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Progress Report. Grant W-22-6. Study 14.0. Juneau, Alaska USA.
- ZARNKE RL AND WB BALLARD. 1987. Serologic survey for selected microbial pathogens of wolves in Alaska, 1975–82. *Journal of Wildlife Diseases* 23(1):77–85.

PREPARED BY:

Robert O Stephenson
Wildlife Biologist III

SUBMITTED BY:

Roy A Nowlin
Regional Management Assistant

REVIEWED BY:

Mark E McNay
Wildlife Biologist III

Table 1 Units 25A, 25B, 25D, 26B, and 26C wolf harvest, regulatory years 1987–1988 through 1998–1999

Regulatory year	Reported harvest				Method of take		
	M	F	Unk	Total	Trap/snare	Shot	Unk
<i>Unit 25A</i>							
1987–1988	14	16	0	30	7	23	0
1988–1989	2	6	2	10	6	4	0
1989–1990	5	9	0	14	8	6	0
1990–1991	15	6	2	23	18	5	0
1991–1992	7	11	7	25	14	11	0
1992–1993	20	7	0	27	11	16	0
1993–1994	8	10	0	18	15	3	0
1994–1995	7	10	0	17	17	0	0
1995–1996	7	8	0	15	11	4	0
1996–1997	9	8	0	17	17	0	0
1997–1998	5	11	0	16	13	3	0
1998–1999	11	7	1	19	15	4	0
<i>Unit 25B</i>							
1987–1988	4	1	1	6	5	1	0
1988–1989	3	4	5	12	12	0	0
1989–1990	3	1	1	5	4	1	0
1990–1991	2	2	1	5	4	1	0
1991–1992	7	5	1	13	13	0	0
1992–1993	7	7	1	15	14	1	0
1993–1994	6	1	5	12	11	1	0
1994–1995	4	9	3	16	16	0	0
1995–1996	5	9	0	14	12	2	0
1996–1997	5	5	0	10	9	1	0
1997–1998	8	6	0	14	14	0	0
1998–1999	5	5	1	11	10	1	0
<i>Unit 25D</i>							
1987–1988	2	2	2	6	6	0	0
1988–1989	0	0	2	2	2	0	0
1989–1990	6	5	1	12	9	3	0
1990–1991	14	10	0	24	6	18	0
1991–1992	8	11	0	19	9	10	0
1992–1993	2	1	8	11	9	1	1
1993–1994	10	7	2	19	17	2	0
1994–1995	18	12	2	32	31	1	0
1995–1996	12	5	0	17	11	6	0
1996–1997	12	6	1	19	16	3	0
1997–1998	10	1	1	12	8	4	0
1998–1999	2	1	2	5	4	1	0

Unit 26B

Table 1 Continued

Regulatory year	Reported harvest				Method of take		
	M	F	Unk	Total	Trap/snare	Shot	Unk
1987-1988	2	1	0	3	0	3	0
1988-1989	12	3	0	15	7	7	1
1989-1990	4	7	0	11	3	7	1
1990-1991	15	9	1	25	0	24	1
1991-1992	10	4	3	17	6	10	1
1992-1993	14	11	6	31	5	26	0
1993-1994	17	11	2	30	10	20	0
1994-1995	11	5	0	16	4	12	0
1995-1996	9	3	1	13	2	11	0
1996-1997	14	10	0	24	4	15	5
1997-1998	4	3	0	7	0	7	0
1998-1999	8	7	2	17	1	16	0
<i>Unit 26C</i>							
1987-1988	1	1	0	2	0	2	0
1988-1989	3	0	0	3	0	3	0
1989-1990	1	0	0	1	0	1	0
1990-1991	7	4	1	12	2	10	0
1991-1992	3	2	0	5	0	5	0
1992-1993	3	3	0	6	3	3	0
1993-1994	0	0	0	0	0	0	0
1994-1995	4	1	0	5	2	3	0
1995-1996	1	1	0	2	0	2	0
1996-1997	1	0	0	1	1	0	0
1997-1998	2	0	0	2	1	1	0
1998-1999	6	5	0	11	2	9	0

Table 2 Units 25A, 25B, 25D, 26A, and 26B wolf harvest chronology percent by time period, regulatory years 1987–1988 through 1998–1999

Regulatory year	Harvest periods									Unk	n
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr		
Unit 25A											
1987–1988	3	7	0	3	7	7	7	67	0	0	30
1988–1989	0	30	0	10	10	0	10	40	0	0	10
1989–1990	0	21	0	21	14	29	14	0	0	0	14
1990–1991	0	4	0	0	26	13	17	39	0	0	23
1991–1992	8	0	0	12	12	16	12	36	4	0	25
1992–1993	7	4	0	15	7	0	4	59	4	0	27
1993–1994	0	17	0	5	11	39	17	0	0	0	18
1994–1995	0	0	0	12	6	18	23	41	0	0	17
1995–1996	0	27	0	13	33	0	27	0	0	0	15
1996–1997	0	0	0	0	6	18	12	35	29	0	17
1997–1998	0	19	0	0	12	6	0	62	0	0	16
1998–1999	0	16	0	0	26	21	5	32	0	0	19
Unit 25B											
1987–1988	0	0	0	17	17	33	17	17	0	0	6
1988–1989	0	0	0	17	50	8	17	8	0	0	12
1989–1990	0	0	0	20	60	0	0	20	0	0	5
1990–1991	0	0	0	0	20	20	0	60	0	0	5
1991–1992	0	0	0	0	69	8	15	8	0	0	13
1992–1993	0	0	0	0	7	33	27	33	0	0	15
1993–1994	0	0	0	8	25	6	0	8	0	0	12
1994–1995	0	0	0	19	0	44	19	19	0	0	16
1995–1996	0	14	0	0	7	36	29	14	0	0	14
1996–1997	0	10	0	0	30	20	30	10	0	0	10
1997–1998	0	0	0	29	14	7	50	0	0	0	14
1998–1999	0	0	0	0	55	0	9	36	0	0	11
Unit 25D											
1987–1988	0	0	0	0	50	33	17	0	0	0	6
1988–1989	0	0	0	0	50	0	50	0	0	0	2
1989–1990	0	0	0	0	42	0	25	33	0	0	12
1990–1991	0	8	0	0	8	8	0	75	0	0	24
1991–1992	0	0	0	0	0	5	21	74	0	0	19
1992–1993	0	0	0	9	18	0	64	0	9	0	11
1993–1994	0	0	0	0	32	26	10	26	5	0	19
1994–1995	0	0	0	25	0	16	22	28	3	6	32
1995–1996	0	0	0	6	23	29	6	35	0	0	17
1996–1997	0	0	0	16	32	26	10	5	10	0	19
1997–1998	0	17	0	0	58	0	8	0	17	0	12
1998–1999	0	0	0	0	0	0	80	20	0	0	5

Table 2 Continued

Regulatory year	Harvest periods									Unk	n
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr		
<i>Unit 26B</i>											
1987-1988	0	0	0	0	0	0	33	33	33	0	3
1988-1989	0	13	0	7	33	0	0	40	7	0	15
1989-1990	18	18	0	27	18	9	0	9	0	0	11
1990-1991	16	8	0	4	0	4	0	4	64	0	25
1991-1992	18	6	0	0	24	12	0	18	24	0	17
1992-1993	3	0	0	0	0	0	3	58	36	0	31
1993-1994	7	13	0	3	0	3	33	23	17	0	30
1994-1995	0	44	0	6	12	0	0	19	19	0	16
1995-1996	0	0	0	8	15	8	15	8	46	0	13
1996-1997	0	4	0	0	17	13	13	46	8	0	24
1997-1998	43	0	0	14	0	0	14	0	29	0	7
1998-1999	6	0	0	0	0	6	18	47	24	0	17
<i>Unit 26C</i>											
1987-1988	50	0	0	0	0	0	0	0	50	0	2
1988-1989	0	67	0	0	0	0	0	0	33	0	3
1989-1990	100	0	0	0	0	0	0	0	0	0	1
1990-1991	25	0	0	25	0	0	0	0	50	0	12
1991-1992	100	0	0	0	0	0	0	0	0	0	5
1992-1993	17	33	0	0	0	0	0	50	0	0	6
1993-1994	0	0	0	0	0	0	0	0	0	0	0
1994-1995	20	40	0	0	0	0	0	40	0	0	5
1995-1996	0	50	0	0	0	0	0	50	0	0	2
1996-1997	100	0	0	0	0	0	0	0	0	0	1
1997-1998	0	0	0	0	0	0	0	50	50	0	2
1998-1999	9	0	0	0	0	0	0	36	55	0	11

Table 3 Units 25A, 25B, 25D, 26B, and 26C harvest percent by transport method, regulatory years 1987–1988 through 1998–1999

Regulatory year	Method of transportation								<i>n</i>
	Airplane	Dogsled, Skis, Snowshoes	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unk	
<i>Unit 25A</i>									
1987–1988	73	7	3	0	17	0	0	0	30
1988–1989	10	20	10	0	60	0	0	0	10
1989–1990	21	29	0	0	36	0	14	0	14
1990–1991	0	13	4	0	70	0	0	13	23
1991–1992	8	8	0	0	72	0	0	12	25
1992–1993	11	0	0	0	78	0	4	7	27
1993–1994	11	0	6	0	83	0	0	0	18
1994–1995	24	0	0	0	76	0	0	0	17
1995–1996	13	47	0	0	40	0	0	0	15
1996–1997	0	0	0	0	100	0	0	0	17
1997–1998	12	19	0	0	69	0	0	0	16
1998–1999	16	0	0	0	84	0	0	0	19
<i>Unit 25B</i>									
1987–1988	0	17	0	0	67	0	17	0	6
1988–1989	0	17	0	0	83	0	0	0	12
1989–1990	60	0	0	40	0	0	0	0	5
1990–1991	20	0	0	0	80	0	0	0	5
1991–1992	0	0	0	0	100	0	0	0	13
1992–1993	7	13	0	0	67	0	0	13	15
1993–1994	0	42	8	0	50	0	0	0	12
1994–1995	0	6	0	0	75	0	0	19	16
1995–1996	0	7	14	0	79	0	0	0	14
1996–1997	0	10	10	0	80	0	0	0	10
1997–1998	0	57	0	0	43	0	0	0	14
1998–1999	9	9	0	0	73	0	0	9	11

Table 3 Continued

Regulatory year	Method of transportation								<i>n</i>
	Airplane	Dogsled, Skis, Snowshoes	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unk	
<i>Unit 25D</i>									
1987-1988	0	0	0	0	100	0	0	0	6
1988-1989	0	0	0	0	100	0	0	0	2
1989-1990	8	0	0	0	92	0	0	0	12
1990-1991	54	0	0	0	46	0	0	0	24
1991-1992	58	0	0	0	42	0	0	0	19
1992-1993	9	0	0	0	82	0	9	0	11
1993-1994	11	0	0	0	89	0	0	0	19
1994-1995	9	0	0	0	91	0	0	0	32
1995-1996	0	0	0	0	100	0	0	0	17
1996-1997	5	0	0	0	95	0	0	0	19
1997-1998	33	0	0	0	67	0	0	0	12
1998-1999	0	0	0	0	100	0	0	0	12
<i>Unit 26B</i>									
1987-1988	33	0	0	0	0	0	33	33	3
1988-1989	13	0	0	0	47	0	33	7	15
1989-1990	18	0	0	9	0	0	64	9	11
1990-1991	12	0	0	0	16	0	20	52	25
1991-1992	18	6	0	0	24	0	53	0	17
1992-1993	3	0	0	0	13	0	84	0	31
1993-1994	10	0	0	0	40	0	48	3	
1994-1995	38	0	6	0	6	0	44	6	16
1995-1996	0	0	0	0	46	0	39	15	13
1996-1997	0	17	0	0	37	0	25	21	24
1997-1998	43	0	0	0	0	0	57	0	7
1998-1999	6	0	0	0	35	0	24	35	17

Unit 26C

Table 3 Continued

Regulatory year	Method of transportation								<i>n</i>
	Airplane	Dogsled, Skis, Snowshoes	Boat	3- or 4-Wheeler	Snowmachine	ORV	Highway vehicle	Unk	
1987-1988	50	0	0	0	0	0	0	50	2
1988-1989	67	0	0	0	33	0	0	0	3
1989-1990	100	0	0	0	0	0	0	0	1
1990-1991	25	0	0	0	75	0	0	0	12
1991-1992	60	0	40	0	0	0	0	0	5
1992-1993	50	0	0	0	50	0	0	0	6
1993-1994	0	0	0	0	0	0	0	0	0
1994-1995	60	0	0	0	40	0	0	0	5
1995-1996	50	0	0	0	50	0	0	0	2
1996-1997	100	0	0	0	0	0	0	0	1
1997-1998	0	0	0	0	100	0	0	0	2
1998-1999	9	0	0	0	91	0	0	0	11

LOCATION

GAME MANAGEMENT UNIT: Unit 26A (56,000 mi²)

GEOGRAPHIC DESCRIPTION: Western North Slope

BACKGROUND

Wolf numbers in Unit 26 have fluctuated widely since the turn of the century. During the early 1900s, caribou, moose, and wolves were less abundant than they are today. Caribou and moose numbers increased after 1930, and by the 1940s wolves were abundant. Wolf numbers were greatly reduced by federal wolf control during the 1950s and by public aerial hunting during the 1960s. Following the ban on aerial wolf hunting in 1970 and land-and-shoot aircraft hunting of wolves in 1982, wolf populations increased, especially in the mountains and foothills of the Brooks Range. Wolves are less abundant on the coastal plain because of the seasonal scarcity of caribou, outbreaks of rabies, and their vulnerability to hunters in the open country.

The reported annual harvest of wolves in recent years has ranged from 13 to 60 animals, but the actual annual harvest has ranged from approximately 50 to 120. The pelts of most wolves harvested in Unit 26A are used locally for the manufacture of parka ruffs or handicrafts and often are not sealed. The harvest of wolves is greatest in the southeastern part of Unit 26A where residents of Anaktuvuk Pass and Nuiqsut hunt and trap wolves throughout the winter.

Trent (1988) surveyed a 16,848 km² (6480 mi²) area around Umiat and estimated density in 1986 at 2.6 wolves/1000 km² and 2.7–3.2 wolves/1000 km² in 1987. Carroll (1994) surveyed a 23,293 km² (8955 mi²) using a Traditional Track Count method and a 10,343 km² (3994 mi²) area around Umiat using a Track Intercept Probability technique in 1992 and estimated the density of wolves to be 4.2 wolves/1000 km². A Sample Unit Probability Estimator (SUPE) was used in 1994 to count wolves in the 10,343 km² (3994 mi²) study area around Umiat and the density was estimated at 4.1 wolves/1000 km².

Stephenson and James (1982) estimated the wolf population size for Unit 26A at 144–310 wolves in 1982. In 1993 it was estimated that there were 240–390 wolves (1.8–2.9 wolves/1000 km²) in 32 to 53 packs in Unit 26A (Carroll, 1997).

MANAGEMENT DIRECTION

MANAGEMENT GOALS AND ACTIVITIES

- 1 Maintain viable wolf populations in Unit 26A.
 - Monitor the population density of wolves in the most heavily hunted area in Unit 26A once every 3 years.
 - Monitor harvest through the statewide sealing program by interviewing

knowledgeable people in the villages and working with the North Slope Borough (NSB) to develop a more effective harvest-monitoring program.

- Interview hunters, guides, and pilots to collect harvest and population status information.
- 2 Determine impact of wolves on Unit 26A moose.
 - Monitor the wolf population by conducting surveys in the primary moose habitat area once every 3 years.
 - Record wolf observations during moose counts and compare to observations made during past counts.
 - 3 Involve the public in developing a management plan and in making future management decisions concerning wolves.

METHODS

A Sample Unit Probability Estimator (SUPE) sample design was used to census wolves in a 10,343 km² area bordered by the Colville, Killik, and Itkillik rivers and Gunsight Mountain. Surveys were flown using a PA-18 and a Scout aircraft on 15 and 16 April 1998. The study area was divided into 4 x 4 mile sample units. The units were classified into high, medium and low categories; according to the likelihood they contained fresh wolf tracks. We randomly selected units to be surveyed, with proportionally the most units in the "high" category surveyed, "medium" second, and "low" third. We attempted to fly surveys 2 days after a snowfall. Each selected unit was searched thoroughly to determine whether or not fresh wolf tracks were present. When tracks were found we followed them to determine how many wolves were in the pack, and what course the wolves had followed since the last snowfall. A population estimate for the area was obtained using the number of wolves counted and by determining the probability of observing wolf tracks on the survey, which is a function of the number and category of sample units containing wolf tracks. To prepare accurate estimates, a researcher must not miss any wolf tracks in the selected sample units, correctly identify all sample units that a set of tracks passes through, and correctly enumerate the number of wolves in the packs (Becker, 1998).

We collected harvest data from sealing certificate records and informal discussions with knowledgeable village residents. Harvest data for some villages was obtained through the NSB Harvest Documentation Program that maintains monitoring in North Slope villages. In past years we have obtained composition data from wolf carcasses collected by hunters at Anaktuvuk Pass.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

We estimated the number of wolves in Unit 26A in 1993. Assuming that most of the coastal plain has a lower wolf density than the foothill region where we surveyed, we estimated that 240–390 wolves (1.8–2.9 wolves/1000 km²) in 32 to 53 packs were resident in Unit 26A.

A SUPE sample design was used to census wolves in a 10,343 km² area bordered by the Colville, Killik, and Itkillik rivers and Gunsight Mountain on 15 and 16 April 1998. Lack of fresh snow and wind blown snow conditions resulted in poor tracking conditions in the southern half of the study area. We concentrated our efforts on the northern 5000 km². Only 7 wolves were seen in 2 packs, resulting in an estimate of 8 wolves, with a confidence range of 5–11 at the 90% level. A density estimate was calculated at 1.6 wolves per 1000 km² in the 5000 km² area.

Results of surveys indicate the density of wolves increased from approximately 2.6 wolves/1000 km² in 1987 to 4.2 wolves/1000 km² in 1992 and 4.1 wolves/1000 km² in 1994. Although our 1998 survey was incomplete it was apparent that the density of wolves had declined in the area (Table 1).

The number of wolves seen during moose surveys has also declined in recent years. During the spring 1991 moose census 29 wolf sightings were recorded in 39 hours of flight in Unit 26A. During the 1995 survey, 16 wolves were observed during 35 hours of flight. We did not see any wolves during moose counts in 1998 and 1999.

The most likely reason that wolf numbers in the study area have decreased in recent years is a reduced prey base. The Unit 26A moose population declined by 75% between 1992 and 1996. In addition, very few caribou from either the Teshekpuk Herd or the Western Arctic Herd have wintered in the area between Umiat and Anaktuvuk Pass in recent years. It is also possible that disease could have been a factor in the decline in wolf numbers.

In order to assist with the recovery of the 40 Mile Caribou Herd, North Slope residents agreed to have 15 wolves relocated from the Tok area to the North Slope. At the request of local residents the wolves were not collared, so it will be difficult to monitor the survival of the wolves.

Population Composition

US National Park Service and department staff collected necropsy data on wolves harvested at Anaktuvuk Pass from the winters of 1985–1986 to 1992–1993. Out of 110 wolf carcasses examined at Anaktuvuk Pass during 1990–91, 73 were from wolves harvested in Unit 26A. Forty-six (42%) were males, 52 (47%) were females, and 12 (11%) were unknown. Of 82 carcasses that were aged, 37 (45%) were adults and 45 (55%) were pups. Ninety-three (85%) of the wolves were gray or white, and 17 (15%) were black. Sixty-seven (61%) of these wolves were shot and 43 (39%) were trapped. Fifteen were caught during December 23 during

January 23 during February, and 44 during March.

Of 52 carcasses examined during 1991–1992, 35 were from wolves harvested in Unit 26A. Twenty-eight (54%) were males, 23 (44%) were females, and 1 was unknown. Twenty-three (44%) were pups, 15 (29%) were adults, and 4 were of unknown age. Eight (15%) animals were black, 43 (81%) were gray, and one was unknown. Twenty (38%) were shot and 32 (62%) were trapped.

Of the 48 carcasses examined at Anaktuvuk Pass during 1992–1993, 21 were taken in Unit 26A. Ten (48%) were males, 2 (10%) were females, and 9 were unknown. Twelve (57%) were shot and 9 (43%) were trapped. All were gray.

No composition data was available from Anaktuvuk Pass after 1993. Composition of the harvest probably does not reflect accurate age composition because pups are more susceptible to harvest than adults. Composition data from sources other than hunter harvest are not available at this time.

Distribution and Movements

Most wolves are in the southern portion of Unit 26A in the Brooks Mountain Range and foothills and along the Colville River system. However, residents have seen wolves in increasing numbers on the coastal plain during recent years. Wolves often move toward areas of high caribou concentration. For instance, during the winters of 1990–1991 and 1993–1994, many caribou concentrated near Anaktuvuk Pass, which attracted wolves and resulted in a large wolf harvest.

MORTALITY

Harvest

Season and Bag Limit.

Area	Bag limit	Season
Unit 26A:		
Trapping	No limit	1 Nov–15 Apr
Hunting	10 wolves	10 Aug–30 Apr

Board of Game Actions and Emergency Orders. The Board of Game had made it legal under trapping regulations to shoot a wolf the same-day-airborne if the wolf is either caught in a trap or snare or over 300 feet from the airplane at the time of taking. In 1999 a citizen referendum made it illegal to hunt wolves the same-day-airborne.

Hunter/Trapper Harvest. During the 1996–1997 season, 21 wolves were sealed. Twelve (57%) were males and 9 (43%) were females. Seventeen (81%) were gray, 3 (14%) were black, and 1 (5%) was white. During 1997–1998, 16 wolves were sealed. Twelve (75%) were males and 4 (25%) were females. Eleven (69%) of the wolves were gray and 5 (31) were black. During 1998–1999, 15 wolves were sealed. Nine (60%) were males, 5 (33%) were females, and 1

(7%) was unknown. Ten (67%) of the wolves were gray, 2 (13%) were black, and 3 (20%) were white. (Table 2)

With the assistance of department personnel, the NSB Department of Wildlife Management began a Harvest Documentation Project in 1995. The NSB found during 1994–1995 that at least 59 wolves were harvested in Anaktuvuk Pass while 17 were sealed. Eighteen were harvested in Nuiqsut, 2 in Atkasuk, and 8 in Kaktovik while none were sealed in any of those villages (Brower and Opie 1996,1997; Hepa and Brower, 1997).

Permit Hunts. There were no permit hunts for wolves in Unit 26A during the reporting period.

Hunter Residency and Success. In 1996–1997, 3 North Slope residents harvested 18 wolves, 1 nonlocal state resident harvested 2 wolves, and 1 wolf was reported harvested by a nonresident hunter. During 1997–1998, 4 North Slope residents harvested all 16 wolves. In 1998–99, 8 North Slope residents harvested 14 wolves and a nonresident harvested 1 wolf. There is no information on the number of unsuccessful hunters.

Method of Take, Transportation, and Chronology. The method of take, transportation, and chronology are summarized in Tables 3 and 4. During 1996–1997, 6 (29%) animals were ground shot and 15 (71%) were trapped. Twenty (95%) animals were taken by hunters using snowmachines for transportation and 1 (5%) was taken by a hunter using aircraft. The chronology of harvest was August 1, October 1, December 1, January 4, February 11, and March 2.

During 1997–1998, all 16 animals were ground shot and were taken by hunters using snowmachines for transportation. The chronology of harvest was November 2, December 5, January 3, February 1, March 5, and April 3.

During 1998–99, all 15 animals were ground shot. Thirteen (87%) animals were taken by hunters using snowmachines for transportation, and 2 (5%) were taken by hunters using aircraft. The chronology of harvest was August 1, September 1, January 1, February 4, March 5, and April 3.

Other Mortality

We have no information to report on other sources of mortality.

HABITAT

Assessment

Unit 26A contains extensive open habitat and a large seasonal prey base available to wolves. The Western Arctic caribou herd (WACH), which numbers over 450,000 animals, seasonally occupies parts of Unit 26A and a portion of this herd remains throughout the winter. The Teshekpuk Lake Caribou Herd (TLH) numbers over 25,000 animals, and most of this herd remains in the unit during most years.

The Colville River moose population numbered approximately 1600 by 1991 but declined by

75% between 1992 and 1996; this consistent prey base has been greatly reduced but is now recovering. Dall sheep are preyed upon in mountainous regions, but also declined in the 1990s. Snowshoe hares have moved into the Colville River system during the 1990s and increased dramatically, providing another food source for wolves.

Petroleum exploration and development may affect some wolf habitat. Hunter/trappers have reported that wolves move out of areas of Unit 26A when seismic exploration is taking place.

Enhancement

There were no habitat enhancement activities for wolves in Unit 26A during the reporting period.

CONCLUSIONS AND RECOMMENDATIONS

The results of wolf population surveys indicate that the density of wolves in the southeast corner of the Unit 26A increased from 2.6 wolves/1000 km² in 1986 to 4.2 wolves/1000 km² in 1992 and 4.1 wolves/1000 km² in 1994, but declined to 1.6 wolves/1000 km² in 1998. The number of wolves seen during moose surveys has also declined.

Wolf numbers in the study area have decreased because of a reduced prey base. The Unit 26A moose population declined by 75% between 1992 and 1996. In addition, very few caribou from either the Teshekpuk Herd or the Western Arctic caribou herd have wintered in the area between Umiat and Anaktuvuk Pass since 1997.

We have not conducted counts in other areas of Unit 26A, but the number of wolves sealed throughout the unit has decreased in recent years. Assuming that hunting pressure has stayed the same, this would indicate that there has been a decline in the wolf population throughout Unit 26A. Hunter/trapper harvest and disease in the wolf population have also contributed to the decline in wolf numbers.

Because many North Slope residents tan their wolf pelts at home and do not have them sealed, the department's wolf sealing program does not provide accurate harvest information. Department personnel have been assisting the NSB develop a harvest documentation system that is more acceptable to local residents. Harvest monitors have been hired in each village and are collecting harvest information for several species. During 1994–1995 the NSB found that at least 59 wolves were harvested in Anaktuvuk Pass while 17 were sealed and that 18 were harvested in Nuiqsut while none was sealed. We will have more accurate harvest information if the NSB program continues and becomes established in more North Slope villages.

A wolf management plan for the North Slope was developed during 1992 and 1993. In developing the management plan, public meetings were held in North Slope villages, and local governments and federal management agencies were consulted. Most local people agreed that 1) a moderate level of harvest of wolves should continue, 2) wolf pelts are highly prized and are a valuable resource for North Slope residents, 3) wolf control is unnecessary on the North Slope at this time, 4) residents oppose using aircraft to harvest wolves, and 5) if

wolf populations become too large, local people could use ground hunting methods to control the populations.

Wolf predation has been a factor for both Dall sheep and moose populations in Unit 26A. Sheep populations declined in number throughout the Brooks Range in the early to mid 1990s, and hunters reported finding the remains of many sheep that apparently were killed by wolves in the mountains. The Colville River moose population also declined by 75% between 1992 and 1996. Several factors were involved in this decline, one of which is wolf predation. The moose population has begun to increase since 1997 while the density of wolves has been low. It is difficult to determine whether the wolf density is driving the moose population fluctuation or if the wolves immigrated to the area in response to high moose and caribou numbers and left when the numbers of prey animals declined. We will continue to conduct wolf and moose surveys to monitor the impact of hunters on wolves and the combined impact of hunters, bears, and wolves on moose.

In order to assist with the recovery of the 40 Mile Caribou Herd, North Slope residents agreed to have 15 wolves relocated from the Tok area to the North Slope. At the request of local residents, the wolves were not collared, so it will be difficult to monitor the survival of the wolves.

Although the wolf population has declined in Unit 26A, I recommend no changes in bag limits or seasons at this time. The decline in wolf density in the study area appears to be more related to a reduced prey base than it is to hunting pressure. The Unit 26A moose population is currently recovering. Caribou movements are variable, but if in the future caribou become more plentiful in the area, wolf numbers will also be more abundant. Because aerial and land-and-shoot hunting are not allowed, extensive areas in Unit 26A receive little hunting pressure. Except for the area within 50–70 miles of Anaktuvuk Pass, much of the wolf population inhabiting the foothills and mountains of the Brooks Range probably will not be heavily hunted or trapped. Hunters from other North Slope villages range over much of the coastal plain where wolves probably will not become plentiful.

LITERATURE CITED

- BECKER, EF AND C GARDNER. 1990. Wolf and wolverine density estimation techniques. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration Progress Report Grant W-23-3, Study 7.15.
- BECKER, EF 1991. A terrestrial furbearer estimator based probability sampling. *J. Wildlife Manage.* 55(4): 730–737.
- , MA SPINDLER AND TO OSBORNE. 1998. A population estimator based on network sampling of tracks in the snow. *J. Wildlife Manage* 62(3): 968–977.
- BROWER, HK AND RT OPIE. 1996. North Slope Borough Subsistence Documentation Project: Data for Anaktuvuk Pass, Alaska for the Period July 1, 1994 to June 30, 1995. North Slope Borough Department of Wildlife Management Report. 36 pp. Available from

North Slope Borough Department of Wildlife Management, Box 69, Barrow, Alaska 99723 USA.

———, AND ———. 1997. North Slope Borough Subsistence Documentation Project: Data for Nuiqsut, Alaska for the Period July 1, 1994–June 30, 1995. North Slope Borough Department of Wildlife Management Report. 44 pp. Available from North Slope Borough Department of Wildlife Management, Box 69, Barrow, Alaska 99723 USA.

CARROLL GM. 1997. Wolf survey-inventory progress report. Pages 183–192. *in* M. V. Hicks ed. Management Report of survey-inventory activities, 1993 to 1996. Wolf. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Progress Report. Grants W-24-2, W-24-3, W-24-4. Juneau, Alaska USA.

GARDNER C AND EF BECKER. 1991. Wolf and wolverine density estimation techniques. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Progress Report. Grant W-23-4. Study 7.15. Juneau, Alaska USA.

HEPA, RT, HK Brower, and D Bates. 1997. North Slope Borough Subsistence Harvest Documentation Project: Data for Atkasuk, Alaska for the Period July 1, 1994 to June 30, 1995. Department of Wildlife Management, North Slope Borough, Barrow, Alaska USA.

JAMES, DD 1982. Unit 26A wolf survey-inventory progress report. Pages 114–115 *in* JA Barnett, ed. Annual report of survey-inventory activities. Part VII. Beaver, Furbearers, Lynx, Wolf and Wolverine. Vol. XII. Alaska Department Fish and Game. Federal Aid in Wildlife Restoration Progress Report Grant W-22-1. Job 7.0, 14.0, and 15.0. Juneau, Alaska USA.

TRENT, JN 1988. Unit 26A wolf survey-inventory progress report. Pages 60–63 *in* S O Morgan, ed. Annual report of survey-inventory activities. Part XV. Wolf. Vol. XVIII. Alaska Department Fish and Game. Fed. Aid in Wildlife Restoration Progress Report Grant W-22-6, Job 14.0. Juneau, Alaska USA.

PREPARED BY:

Geoff Carroll
Wildlife Biologist III

SUBMITTED BY:

Peter J. Bente
Survey-Inventory Coordinator

Table 1 Wolf population estimates for Unit 26A and the Colville River study area, 1982–1998

Year	Colville River Study Area ^a		Unit 26A		Basis of estimate
	Wolves per 1000 km ²	Number of packs	Population estimate	Number of packs	
1982			144–310		TTC survey ^b and extrapolation to rest of unit.
1986	2.6	2			TTC survey ^b
1987	2.7–3.2	4–5			TTC survey ^b
1990			145–350	14–30	Past surveys and interviews with pilots and hunters.
1992	2.9–4.2	4–8			TTC survey ^b
1992	4.0–6.2	5–8			TIP survey ^c
1993			240–390	32–53	1992 surveys and interviews with pilots and hunters.
1994	4.1–4.3	8–10			SUPE survey ^d
1998 ^e	1–2.2	2			SUPE survey ^d

^a Colville Study Area - southeast portion of Unit 26A bordered by the Colville, Killik, and Itkillik Rivers and the Brooks Range.

^b Traditional Track Count survey.

^c Track Intercept Probability survey.

^d Sample Unit Probability Estimator survey.

^e Incomplete survey due to poor snow cover.

Table 2 Sex and color of wolves from reported harvests and estimated unreported harvest, Unit 26A, 1989-1999

Regulatory year	Sex			Color			Estimated unreported harvest	Total reported harvest
	% Male	% Females	% Unknown	% Gray	% Black	% White		
1988-1989	38	62		100	0	0		13
1989-1990	71	29		64	29	7	48	14
1990-1991	66	34		83	13	3	82	30
1991-1992	67	28		72	22	6	37	18
1992-1993	59	30	11	79	17	3	42	29
1993-1994	65	32	3	72	17	11	37	60
1994-1995	73	27	0	89	6	5	32	47
1995-1996	42	58	0	85	9	6	41	19
1996-1997	57	43	0	81	14	5	40	21
1997-1998	75	25		69	31	0	30	16
1998-1999	60	33	7	67	13	20	28	15

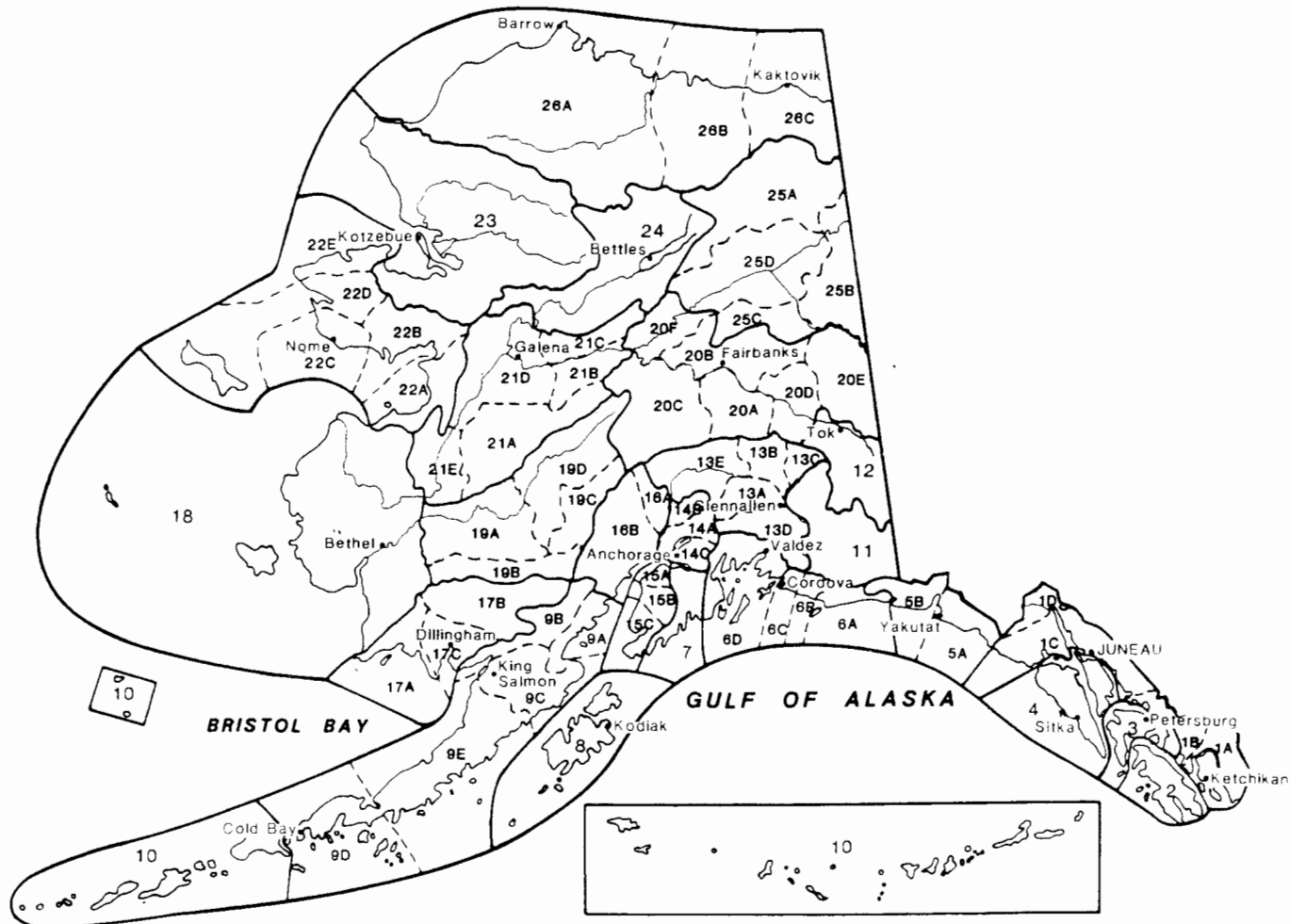
Table 3 Method and transportation percent of reported wolf harvest, Unit 26A, 1988–1999

Regulatory Year	Method of take (%)				Transportation method (%)				Total reported harvest
	Trap	Rifle	Snare	Unknown	Aircraft	Snowgo	ORV	Boat	
1988–1989	15	85				100			13
1989–1990	64	36			15	85			14
1990–1991	20	80			3	90	7		30
1991–1992	39	61			6	94			18
1992–1993	30	63		7	7	89	4		29
1993–1994	33	66	1		8	85	0	7	60
1994–1995	7	90	3		28	72			47
1995–1996	21	74	5			95		5	19
1996–1997	71	29			5	95			21
1997–1998	0	100			0	100			16
1998–1999	0	100	0		13	87			15

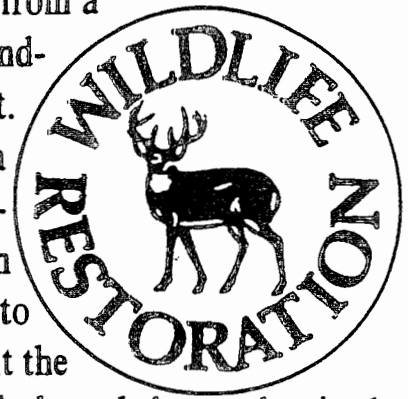
Table 4 Chronology for reported wolf harvest in Unit 26A, 1988–1999

Regulatory year	Month										Unknown	Total
	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May		
1988–1989	1				1		2	9				13
1989–1990		2		1	2	2	2	5				14
1990–1991		1			3			22	4			30
1991–1992		1				2	1	11	3			18
1992–1993		2		2	2			18	4		1	29
1993–1994	2	5		1	4	2	5	29	12			60
1994–1995	2	2		3	5	2	10	13	10			47
1995–1996		1		3				11	1	3		19
1996–1997	1		1		1	4	11	3				21
1997–1998				2	5	3	1	5				16
1998–1999	1	1				1	4	5	3			15

Alaska's Game Management Units



The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sales of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program allots funds back to states through a formula based on each state's geographic area and number of paid hunting license holders. Alaska receives a maximum 5% of revenues collected each year. The Alaska Department of Fish and Game uses federal aid funds to help restore, conserve, and manage wild birds and mammals to benefit the public. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes for responsible hunting. Seventy-five percent of the funds for this report are from Federal Aid.



Craig Flatten

Chris Farmer checks the radio collar of a wolf on Heceta Island